

BRAZILIAN SOLID WASTE POLICY AND THE IMPACT ON WASTE COLLECT IN THE SÃO PAULO CITY

POLÍTICA DE RESÍDUOS SÓLIDOS BRASILEIROS E O IMPACTO SOBRE COLETA DE RESÍDUOS NA CIDADE DE SÃO PAULO

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ABSTRACT

The purpose of this article is to analyze whether or not the Brazilian Política Nacional de Resíduos Sólidos - PNRS (National Solid Waste Policy) has an impact on companies that provide garbage collection services in the city of São Paulo. As a methodology was carried out a qualitative exploratory research, as a case study, supported by direct interviews, supported by a questionnaire with people who work in the solid waste management sector. As a conclusion, it was identified that the Brazilian PNRS has a direct impact on the planning of government agencies and their solid waste collection service providers, including the demand for anticipated investments. Consideration should be given to the survey carried out in the city of São Paulo, due to its importance and complexity, but new studies are necessary for understanding in different municipalities.

Keywords: *National Policy on Solid Waste. Sustainable development. Selective collection.*

RESUMO

O presente artigo tem como objetivo analisar se a Política Nacional de Resíduos Sólidos PNRS impacta ou não nas empresas prestadoras de serviço de coleta de lixo na cidade de São Paulo. Como metodologia realizou-se uma pesquisa qualitativa de caráter exploratório, como estudo de caso, realizada através de entrevistas diretas, com pessoas que atuam no setor de gestão de resíduos

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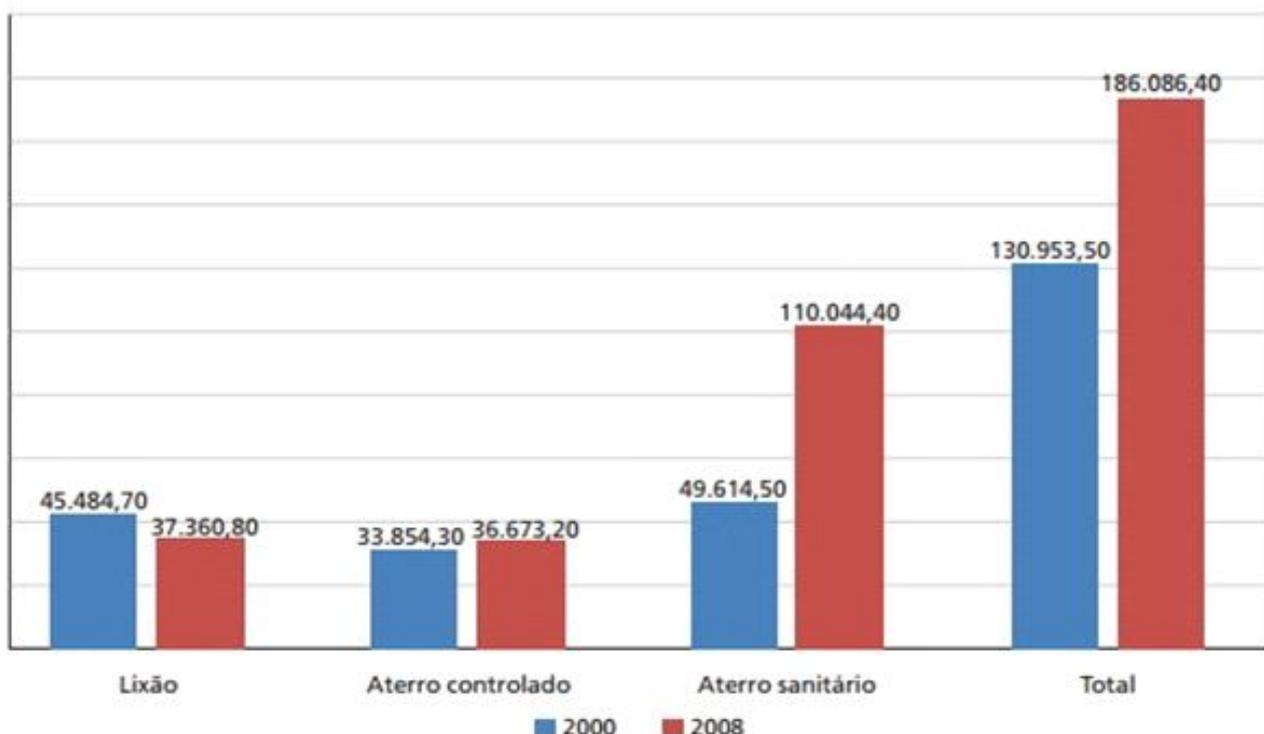
sólidos. Como conclusão identifica-se que a PNRS estabelece impacto direto no planejamento dos órgãos governamentais e seus prestadores de serviço de coleta de resíduos sólidos, incluindo a demanda de antecipação de investimentos. Deve-se considerar significativo o levantamento realizado no município de São Paulo, pela importância e complexidade do mesmo, mas novos estudos são necessários para a compreensão em diferentes municípios.

Palavras-chave: Política Nacional de Resíduos Sólidos. Desenvolvimento sustentável. Coleta seletiva.

1 INTRODUCTION

The 1990s were characterized by the growing concern of civil society and world governments with the environmental impacts caused by materials or products that, in the post-use, were discarded in nature incorrectly. In this context, the approval of the Política Nacional de Resíduos Sólidos - PNRS (National Solid Waste Policy) in Brazil Law No. 12305 / 10 in 2010, incorporates one of the items belonging to Agenda 21, which is the treatment of solid waste. The PNRS is an important tool for the private initiative to incorporate the materials management processes in order to correctly manage their waste by reincorporating them into the productive process or promoting their recycling. Additionally, it is a relevant instrument to treat the growing generation of solid waste in Brazil. The Instituto de Pesquisas Econômicas Aplicadas - IPEA released in its report (IPEA, 2012) data that characterize the growing amount of solid waste in Brazil. Figure 1 shows the variation in the amount of household and / or public solid waste sent to land disposal in the years of 2000 and 2008. The data show a 42% increase in total waste in that period.

Figure 1 - Amount of household and / or public solid waste sent to disposal in the soil.



Source: IPEA (2012).

Note: Values expressed in 1 thousand tons

The data presented in Figure 1, originating in IPEA (2012), show a 122% increase in solid waste destined for the landfill in the period from 2000 to 2008. It is worth noting that the use of the 2012 report, which reflects the 2008 data, are the most up to date analysis of this research. Reinforcing the adequacy of the PNRS that establishes the sanitary landfill as the appropriate destination.

The implementation of the PNRS in Brazil impacts on several actors involved in the treatment of solid waste. In this particular study, attention is focused on companies that provide solid waste collection services and operate in a highly-regulated sector. Collection companies need to meet the demands for material withdrawal on fixed routes, with stipulated frequencies and within restricted time intervals. Failure to comply with these regulations may result in fines and contractual problems with the contracting public agency.

In this context, the objective of this article is to analyze the impact of the National Policy on Solid Waste in companies that provide garbage collection services in the city of São Paulo. The study has relevance for addressing the city of São Paulo, which is the largest in South America, and as such presents a significant complexity in the collection of solid waste. In addition to this introductory chapter, the study presents a review theory, methodology, presentation and analysis of the data ending with the conclusions.

2 THEORETICAL REVIEW

To understand the relevance of the PNRS to Brazil, it was considered necessary to carry out a brief history to contextualize the main actions directed to the protection of the environment in the last decades.

In 1968 appeared the first proposal directed to the environmental preservation whose ideology was to restrain the development in order to prevent the destruction of the environment. This proposal was based on the report created by the Club of Rome also called “Club against the Development”, was written by the industrialized countries with the objective of “zero growth” (FOGLIATTI; FILIPPPO; GOUDARD, 2004). The study fostered discussion of human economic development versus scarce natural resources.

In order to discuss the world’s environmental problems, the Swedish government proposed to the United Nations (UN) the creation of an international conference in Stockholm, in 1972, the environment and its solutions. One of the outcomes of the Conference was the creation of the Action Plan for the Environment that laid the foundation for economic development and environmental preservation. According to Le Prestre (2005) the Conference was an important milestone, for the effort to raise awareness of the environmental issue. For Barros-Platiau (2011) the achievements of society focused on the environment were modest but relevant. Principle 21 of the Stockholm Declaration states that in the conflict between economic development and environmental preservation, States must always protect the environment.

In 1983, ten years after the Stockholm Conference, the World Commission on Environment and Development was established with the main concern of wastes produced by human activities. After a period of discussion between the statesmen and members of civil society, a report called “Our Common Future” was prepared, which established an incompatibility between consumer society and sustainable development.

In 1992, the UN organized the RIO-92 conference, the second world conference on environment and development based in the city of Rio de Janeiro. The event, considered a milestone in history by the joint effort of governments around the world, established measures and actions aimed at the practice of sustainable development and definitively enshrined its concept. The Conference has contributed to the creation of numerous documents, among them the Global Agenda 21, which is responsible for guiding governments and the United Nations to develop and improve quality of life by protecting the ecosystem. According to Malheiros, Phlippi Jr. and Coutinho (2008), Agenda 21 can be defined as a national sustainable development plan that is important for the formulation of public policies focused on the environment.

The World Summit on Sustainable Development also called the Johannesburg or Rio + 10 Summit, took place in 2002 and its main objective was to accelerate and strengthen the implementation of the principles approved in Rio de Janeiro 10 years earlier. Table 1 presents the evolution of the Brazilian Laws with environmental concern.

Table 1- Evolution of laws with environmental concern.

	Date	Name	Focus / Subject
1500 a 1889	1500	Afonsine Ordinations	The cutting of fruit trees is considered an affront and injury to the king.
	1521	Manuelinas Ordinations	Forbidden to hunt some animals with instruments that caused suffering.
	1580		Introduction of the concept of pollution, prohibits throwing in the water what could kill the fish.
	1635	Conservatories	Protection of Brazil-wood, as real property.
	1797	Royal Charter	Forest and wood conservation.
	1799	Regulation of cuts of wood	Implemented rules for cutting trees.
	1808		Foundation of the Botanical Garden, as an environmental and non-monetary issue.
	1850	Law 601	Implantation of environmental liability with punishment of violators.
1900 a 1950	1861	Dom Pedro II	Planting of Tijuca Forest to ensure water supply to Rio de Janeiro, already devastated on the slopes.
	1916	Brazilian Civil Code	Ecology of private rights, such as the prohibition of buildings that pollute water.
	1923	Regulation of Public Health	Preventing harmful factories and workshops from being close to the Community.
	1934	Forestry and Water Code	Control and encourage the industrial use of water. It transfers the responsibility of reducing the environmental aggression to the private sector.
	1937	Cultural heritage	Regulates the tipping of the historical and artistic heritage of Brazil
	1938	Fishing Code	Regulates fishing
	1940	Mining Code	Regulates mineral extraction

Continua...

Continuação da Tabela 1..

1960 a 1980	1964	Statute of the Earth	It establishes the order and ownership of the land.
	1965	Forestry Code	Protection and conservation of flora.
	1967	Wildlife protection	Prohibition of hunting and guarding and definition of wild animal as anything other than homegrown.
	1967	New fishing code	In addition to defining permitted or prohibited periods, it regulates all forms of fishing throughout the national territory.
	1967	Basic Sanitation Policy	Guidelines for the sector of water supply and sanitation.
	1967	Law 5318	Creation of the National Council for the Control of Environmental Pollution.
	1967	Law 5357	Establishment of penalty for polluting maritime vessels in the Brazilian maritime territory.
	1975	Law 1413	Control of pollution of the environment by industrial activities.
	1977	Law 6453	Civil liability for nuclear damage.
	1977	Law 6513	Creation of areas for tourism purposes.
1980 a current	1979	Law 6766	Partitioning of urban land.
	1981	Law 6938	Establishes the National Environmental System.
	1987	Law 7347	Public Civil Action for damages caused to the Environment and others.
	1988	Law 7661	National Coastal Management Plan.
	1988	Federal Constitution -Article 225	Everyone has the right to an ecologically balanced environment. Imposing on the Government and the community the duty to defend and preserve them for present and future generations.
	1998	Law 9605	Law of Environmental Crimes
	1999	Law 9795	National Policy on Environmental Education.
2000	Law 9985	National System of Conservation Units of Nature	

Source: Adapted from Boccasius-Siqueira, 2002.

In the Plano de Gestão Integrada de Resíduos Sólidos – PGIRS (Integrated Management Plan for Solid Waste) of the City of São Paulo, (PGIRS, 2012) presents the laws, decrees, resolutions, norms, guidelines and normative instructions, making a total of 109 documents, including Federal, State and Municipal.

Boccasius-Siqueira (2002) points out that since the 1980s, in the face of global involvement in environmental issues and the Report “The Limits to Growth” presented at the Stockholm Conference, there was greater involvement of the State itself as a co-responsible for environmental management. In 1981, as a result of the National Environmental System, the liability of the causative agent in the repair of damages caused to the environment begins.

Law 12305, which is the highlight in this research, indicates the degree of evolution that the initiatives of the last three decades have provided, since it becomes responsible for all causes directly or indirectly of solid waste. This context involves: manufacturers, importers, distributors and traders in the production chain, in addition to consumers and holders of public services for urban cleaning and waste management (Article 3, paragraph XVII).

In Law 12305, the instruments are extended not only to plans, but also to technical and financial cooperation, scientific and technological research, environmental education and financial incentives, among others. This context establishes the need for states and municipalities to have a greater interest in the direct involvement of solid waste management, since they may benefit from the political image and development of local projects. The companies hired to provide the direct services

of the municipalities have, in principle, greater pressure for involvement in these instruments required at the national level by the PNRS.

In summary, it is up to the State to support the initiatives of the municipalities and both to obey the need to provide the information requested by the National Government. What was formerly the responsibility of industrial generators, by the recent Law 12305, solid waste is now considered in its origin, that is, households, public roads, commercial establishments, public agencies, industries, health companies, Civil construction, and the transport services and mining.

One of the actions that the municipal solid waste management plan highlights is to present reduction, reuse, selective collection and recycling targets, in order to reduce the amount of waste in the final disposal, even if it is environmentally adequate.

In chapter III, on the responsibilities of generators and public power, Law 12305 points out that those responsible for any damages should fully compensate the costs of repairs done by public agencies.

Section II of Law 12305 originally presents the need for shared responsibility in the logistics chain and establishes the obligations for the implementation of reverse logistics, taking initiative and implementation of manufacturers, importers, distributors and merchants. These actors are responsible for drawing up agreements with recyclable waste pickers and collection service providers, exempting consumers from criminal sanctions. Thus, once rules and procedures are implemented, they incorporate the obligation to adequately pack the generated waste.

In Chapter VI of Law 12305, as prohibitions, the rules on solid waste in various situations and locations, such as beaches, water resources, open air and unlicensed burning.

As a direct consequence of Law No. 12305 / 10, the PGIRS São Paulo was elaborated and delivered to the city in 2012. It highlights the current situation, the goals and the means to achieve the expected results, from a technical and institutional point of view and legal, economic and financial, social, environmental and public health.

3 METHODOLOGY

This is a qualitative study using as a strategy the case study. The objective is to analyze the impacts of the National Policy on Solid Waste - PNRS in the urban collection services of the city of São Paulo. The data collection involves a semi structured interview with representatives of the – Autoridade Municipal de Limpeza Urbana - AMLURB (Municipal Authority of Urban Cleaning), public entity responsible for the planning of cleaning and collection of waste in the city of São Paulo, and a company that provides solid waste collection services in the city from Sao Paulo. In order to serve the Municipality of São Paulo, there are two companies.

For Yin (2015), the case studies present adequate conditions to raise variables with a deeper investigation, in an analysis that considers the perceptions in a certain period of time and a magnified observation of the context in which the phenomena occur at that moment.

Stake (1978) states that the researcher who uses the case study focuses on understanding the particularities and complexities.

Yin (2015) further suggests that it is important to determine which type of interview will be performed, whether retrospective or longitudinal. The retrospective interview enables the survey of the past data, the history and the perceptions that remain. The longitudinal has its focus on the present, which must take into account its limit in achieving real-time data collection.

In a discussion of the number of people to interview, Godoi and Mattos (2010) suggest that there is not an exact and standardized number of interviews, just the care of whether they were enough to saturate the research findings.

The interviewees were chosen according to different perspectives. The first, by the manager of AMLURB, receives the direct inference of the new legislation by the Federal Government; the second, by the manager of the company providing solid waste collection services, who suffers the final impacts due to the responsibility of the collection process.

4 DATA ANALYSIS

The interviews were carried out based on the legislative issues and the actions pertinent to the imposition of this legislation. The questionnaire was elaborated with pre-selected questions, allowing the interviewee the option of answering them in writing or through direct speech, facilitating the reporting of facts not covered in the direct questions. The results will be analyzed and interpreted by the interviewers.

The interviewee of the AMLURB preferred the open conversation, and the company Logística Ambiental de São Paulo – LOGA (Environmental Logistics of São Paulo), opted to fill out the questionnaire and later talk with the interviewer. The questions for LOGA were: 1- Law no. 12305 on August 2, 2010 promoted change in the company's strategic planning? 2- Has the City, through AMLURB, demanded new investments or the modification of what was foreseen in the original contract? 3- If so, what are the implications for projects, people, time, investments? 4- What next actions will be taken due to the requirements of the Legislation? 5- Has the collection to meet the goals of AMLURB changed according to the Legislation? 6- If there was "new legislation" would the pressure be different?

For AMLURB, the questions were: 1- Law no. 12305 on August, 2010 promoted change in the strategic planning of collection companies? 2- Was there a requirement for new investments or the modification of what was foreseen in the original contract in these companies? 3- If so, what are the implications for projects, people, time, investments? 4- What next actions will be taken due to the requirements of the Legislation? 5- Has there been any change in AMLURB's goals according to the Legislation? 6- If it did not have the "new legislation" would the goals be different?

At AMLURB located in the North Zone of the city of São Paulo. The interview was carried out with the Secretary of Coordination of the regional prefecture, who had technical property to answer the questions of this study.

In view of the analysis and interpretation of the interview with the Secretary, the immediate initiatives with the contractors for the collection of Resíduos Sólidos Domiciliares - RSD (household solid waste) were highlighted, as well as in 2014 the inauguration of two mechanized sorting plants, with a goal of two more until 2017. He also argued that in year 2012, a total of 350 tons of recycled products were collected and that the goal for 2017 is to move to 1,250 tons of recycled and dry waste, which means an increase of more than three times the current capacity.

Another highlight was the need for the paradigm shift, since the responsibility that previously was only of the public power now incorporates those who produce, market, consume or generate the waste.

The interviewee presented a plan for the reduction of RSD for the next 20 years, elaborated after a public hearing, whose principle involves the participation of all society as responsible for its

management and compliance. It states: “[...] it is part of the companies that render services to the municipality the involvement in the education of the entire society as well».

According to data presented by the PGIRS, in 2012, São Paulo had 5.9% of the population of Brazil, with 11,252,473 habitants and contributed in 2011 with almost 12% of the national gross national product GNP.

For 2017, modest growth of 1.5 million more is expected, well below the Brazilian population growth, but the prospects of waste generation have unfortunately not shown to be small and weighted compared to the population growth.

From the year 2000, there was a decrease in the generation of household waste and an increase in the selective collection. This result presupposes two mediating actions, the first is the implementation of the «garbage charge» and the other the incentive to organize the garbage collectors. However, since 2004, with the extinction of the tax, there has been a resumption of the growth of the generation of garbage and today the trend is still of growth, bordering the 4,000,000 tons per year.

In the 456 pages of the PGIRS of the City of São Paulo, the plan to manage waste growth is fundamental, and for this, it presents in all its scope the need for campaigns that are intended to be distributed in three phases:

First Campaign: 2014 - expansion of selective collection;

Second Campaign: 2015 - beginning of the use of composts and technical guidance;

Third Campaign: 2017 - articulation of the selective collection of Organic RSD and containerized collection of tailings.

The planning foresees the involvement of all those responsible in the waste generation chain over the next 20 years, for a significant reduction in the amount of tons of RSD deposited in landfills.

The Waste Collection Planning should consider the current reality of material collected from the RSD: 51% are organic, 34% dry and 14% wastes. In this way, more than 85% of what is released in landfills today could somehow be turned into resources for other products.

Analyzing these facts, the PGIRS starts to show for each specific area of action, what is its current reality, what its limitations are and what actions are necessary to overcome the weaknesses and reach the objectives.

If there is no solution in these steps, then the product should go to the final destination, which would be landfills. Thus, some initiatives and goals are highlighted. First the implantation of two thousand composts in domiciles, reusing the organic waste, as example the use of fertilizer for residential gardening.

Another initiative should be the creation of a private fund for selective collection and reverse logistics. As a highlight for the reverse logistics, actions have already begun with the textile, light and electronics companies.

Also, worthy of mention is the expansion of the so-called Eco points, to reduce the numerous irregular sites of deposits rejected by civil construction and large-scale household waste, such as sofas, beds, refrigerators. Currently there are 77 Eco points and the goal until December 2017 is to reach 140 Eco points.

It is also identified that in the urban planning there is the involvement of the university environment, now represented by professors and students of Uninove University, but emphasizes that there are still few initiatives and ideas coming from the academy and that the intention of the City Hall is the extension of this link with other educational entities

The interviewee pointed out that the City Council's discussions with the companies that provide collection services are constant, in the search for new solutions, which finally generate the addition of the contracts already made, as well as anticipation of services that favor the goals to be reached. As an example, we report the acquisition of 16 new trucks for the selective collection in 11 new districts, focusing on the increase of the processing of the materials and the increase in the industrialization of these. All this permeating social inclusion, involving new profiles of collectors and scavengers or even hiring within the recycling centers for those who can most benefit socially, because for the City, sustainability must also involve human aspects in the process.

Respondents indicate that the involvement of all: City Hall, service companies and citizens, will allow a better management of RSD, allowing a reduction of financial and environmental costs. Thus, it is expected that the companies that perform the collection will also be involved in the projects, since the perspective is not to increase the contract values currently practiced. An initial investment is possible, with gains in the course of the management process.

The company LOGA is responsible for the collection of Solid Waste in the Central, North and West Regions of the City of São Paulo, with an Area comprising 174 districts, as well as managing the Ponte Pequena Transshipment and Bandeirantes Landfills and Vila Albertina.

In the interview with the Health Solid Waste Coordinator, Francini E. Breitenbach, the following answers were obtained:

The LOGA is a company with specific purpose to carry out the divisible services provided in Concession Contract 027 / SSO / 2004 with the municipality of São Paulo. The Agreement provides for investments over the 20 years of the concession. With the publication of the PNRS, some of the investments were advanced, which consequently altered the company's strategic planning.

An outstanding investment by the interviewee is the one carried out by LOGA in the Mega Central of Recyclable Waste, initially foreseen as a manual, in which the inclusion of pickers in the mechanized system was carried out.

Mega Central's investment was modified: from manual to machining. The implementation of another Mega Central is planned in the Municipal Integrated Solid Waste Management Plan. Any amendment to the Agreement signed with the Prefeitura do Município de São Paulo– PMSP (Prefecture of the municipality of São Paulo) requires an addendum, the financial investment, and the rebalancing of the tariff, by the Granting Authority.

The implications of investments, whether financial or social, vary. Each demand is reviewed by a team of experts. The Concession Agreement provides for an investment and if there is a change from the PMSP, a new analysis is necessary.

All planned actions are taken in order to comply with the provisions of Law 12,305 and its Regulations. It is expected the need to grant investments not foreseen initially, and discussed to meet the demand of the PMSP.

Regardless of the requirements of the new environmental legislation, AMLURB, as the Authority, has the obligation to demand for quality services, and LOGA as a concessionaire seeks to meet and improve the processes. In this sense LOGA highlights its certification by ISO 9001.

According to the interviewee, for LOGA, the legislation did not interfere in the quality of the services, but essentially in the anticipation of investments in infrastructures and in the inclusion of labor, which potentiates possible increases in cost.

5 CONCLUSIONS

In view of the interpretative analysis carried out, it can be seen that the new National Solid Waste Policy - PNRS impacts directly or indirectly on companies providing collection services in the city of São Paulo and influences actions and planning. The impacts mainly involve the anticipation of investments in infrastructure and the hiring of labor to supply the need for new services rendered.

Likewise, the National Solid Waste Policy has also impacted other regulatory and oversight bodies, expanding the demands on the actions that formerly contracted companies should carry out. AMLURB needed to broaden its demands on utility companies to accelerate the process of reducing the final mass in landfills.

The arguments described in the PNRS in their articles and paragraphs are repeated in the speeches of the interviewee of AMLURB, who points out that there is no longer just the care in the collection and urban cleaning, but in plans that develop a new paradigm of not generating, reducing, reusing, Recycling and treating solid waste (Article 7, paragraph II).

It is also highlighted as immediate and constant projects to reach this new paradigm the involvement of the entire chain committed in the generation of solid waste, which differs from the previous paradigm, which considered only the public agencies responsible for the results of the management of these.

Adaptations to comply with the new requirements demanded new financial investments, generating the need of approximation between the public agencies and the companies providing service for adjustment and adjustments that would enable compliance with the required. There are indications that if they were not such requirements, the projects would be implemented, but with other economic characteristics involved in the planning.

The new points presented in the PNRS for the involvement of the entire generating chain are highlighted by the immediate actions of the producing companies, merchants and even the population, with reverse logistics actions or the installation of composters.

The goals involved in the process were pointed out as clear and conscious, causing suppliers to carry out some projects in advance, financially impacting their budget, such as the mechanized system for selective waste.

The approximation between inspection and execution between AMLURB and LOGA (contractor and contractor) was more intensive, although a statistical survey of the number of meetings held and scheduled in relation to the projects being implemented was not carried out. However, the analysis and perception of the The parties are conclusive as to the need for this intensification to ensure that changes in planning are properly formalized.

However, both organizations, public and private, showed in their speech the intensity that exists in the quest for the quality of services provided, as well as the effort to evolve the new concepts and requirements in PNRS.

As the theme is still recent, due to the very promulgation of Law 12305, it is evident the possibility of new studies that determine the characteristics and peculiarities involved in the process of solid waste collection.

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